

# NAVAL HEALTH RESEARCH CENTER

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## *Descriptive Summary of Patients Seen at The Surgical Companies During Operation Iraqi Freedom-1*

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## Descriptive Summary of Patients Seen at the Surgical Companies During Operation Iraqi Freedom-1

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## Summary

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### Introduction

The Navy–Marine Corps Combat Trauma Registry (CTR) is a data repository and warehouse summarizing information from disparate data sets describing events that occurred and treatments administered to individual casualties from the point of injury to rehabilitation. The primary purpose of the CTR is the examination of the events surrounding the administration of care to individual combat casualties as they move through the medical chain of evacuation from point of injury through to rehabilitative outcomes.

### Objective

Included among the medical facilities contributing data to the CTR program are the forward surgical companies during Operation Iraqi Freedom (OIF). These surgical companies are part of the effort by Navy Medicine to develop forward medical capabilities that can offer surgical and operative care near combat areas. They offer resuscitative surgery, medical treatment, and temporary holding facilities, in addition to preparing patients for evacuation. This paper reviews the types of patients admitted to and treatments received at the surgical companies during the major combat period of OIF.

### Method

Databases were received for three surgical companies during the major combat period of OIF – Alpha, Bravo, and Charlie. Data elements reviewed included nationality and status of patients, temporal distributions of patients received, casualty type, triage category, length of stay, and disposition. Mechanism of injury and surgical procedures performed were also reviewed when available.

### Results and Conclusion

Most of the results were derived from the data sets of Alpha and Bravo Surgical Companies. During the major combat phase of OIF, each averaged 15 to 17 patients a day. Bravo Company had many more enemy prisoner of war and foreign national patients, with those two groups accounting for 22% of the patients seen there. At both facilities, fewer than 20% of the US casualties were seen for battle injuries. In contrast, over 75% of the enemy prisoner-of-war admissions were due to battle injuries. The most common surgical procedures performed were irrigation and debridement, fasciotomies, and exploratory laparotomies. Additional results are presented from the data set of Charlie Surgical Company.

## Acronyms

CSH – Combat Support Hospital

CTR – Combat Trauma Registry

DIS – disease

DNBI – disease and non-battle injury

DOA – dead on arrival

DOW – died of wounds

EPW – enemy prisoner of war

INJ – injury

NBI – nonbattle injury

NHRC – Naval Health Research Center

OIF – Operation Iraqi Freedom

OIF-1 – Operation Iraqi Freedom 1 (conventional combat period, March–April 2003)

OR – operating room

RPG – rocket-propelled grenade

RTD – returned to duty

USA – United States Army

USAF – United States Air Force

USMC – United States Marine Corps

USN – United States Navy

WIA – wounded in action

## Introduction

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The Navy–Marine Corps Combat Trauma Registry (CTR) is a data repository summarizing information obtained from data sets describing events that occur and treatments administered to individual casualties from the point of injury, through the medical chain of evacuation, and on to long-term rehabilitative outcomes. While the CTR draws on the experiences of civilian trauma registries in monitoring trauma care delivery, it also addresses concerns specific to military combat, including delays in evacuation and treatment times due to operational setting and situation, and use of personal protective equipment

This report examines information from CTR data sets received from one level of the medical chain of evacuation, the surgical companies, during and immediately after the major combat phase of Operation Iraqi Freedom (OIF) in March and April 2003 (sometimes referred to as OIF-1).

The primary mission of the surgical companies is to provide medical support to Marine and Navy forces in theaters of operation, with mobile, forward treatment facilities (approximately equivalent to level 2 care).<sup>1-3</sup> They provide a range of treatments from short-term medical intervention to damage control surgical care.<sup>4,5</sup> Among the tasks they perform are:

- ❖ Establishing medical treatment facilities for resuscitative surgery, medical treatment, and temporary holding of casualties from supported forces.
- ❖ Preparing for evacuation casualties whose medical requirements exceed the capability of the company or whose estimated length of recovery exceeds established evacuation policy (usually 72 hours).
- ❖ Providing medical support to personnel of other services and nations as provided in applicable regulations and agreements, and providing humanitarian care as required by international law.<sup>6</sup>

A full surgical company medical battalion will usually consist of a headquarters unit along with a triage/evacuation platoon, surgical platoon, holding platoon, combat stress platoon, and an ancillary service platoon.<sup>7</sup> The surgical platoon will consist of three surgical sections, each with one two-table operating room (OR) designed for 24-hour operations. The holding platoon contains three ward sections, each containing 20 medical/surgical beds. The ancillary services platoon contains two laboratory sections, two pharmacy sections, and two x-ray sections. Dental support is provided by an attached dental detachment.

## Methods

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Data were obtained for patients seen at three surgical companies during the major combat phase of OIF-1 – Alpha, Bravo, and Charlie. The data received by the Navy–Marine Corps CTR from the surgical companies are representative of the difficulties encountered in most of the data sets received in that the type and amount of information collected and recorded vary from facility to facility. However, a benefit of receiving multiple data sets is that, to the extent that similar variables and data fields are captured by surgical company personnel, comparisons can be made of the patient population among the various facilities.

Data elements reviewed included nationality, status of patients presented, temporal distributions of admissions, and casualty type. Comparisons between facilities were made concerning both patient composition and number of daily admissions. Additional elements reviewed included triage category, length of stay, and patient disposition. Because of its relationship in estimating patient workloads, particular focus was put on the length of stay and disposition (evacuated, returned to duty) for the various patient types (battle injury, nonbattle injury, disease). When available, the mechanisms of injury and surgical procedures performed were also examined.

### Medical Theater Laydown

Figures 1–3 show the surgical medical facility theater laydown in Iraq at three points in the operation. It can be seen from the figures that Alpha Company was located in Kuwait at Camp Coyote, and remained at this location throughout the operation. Bravo Company initially set up at Camp Anderson, but subsequently moved north to Camp Chesty. Charlie Company also moved, having stood up first at Camp Viper and later, on April 12, 2003, at Camp Edson.

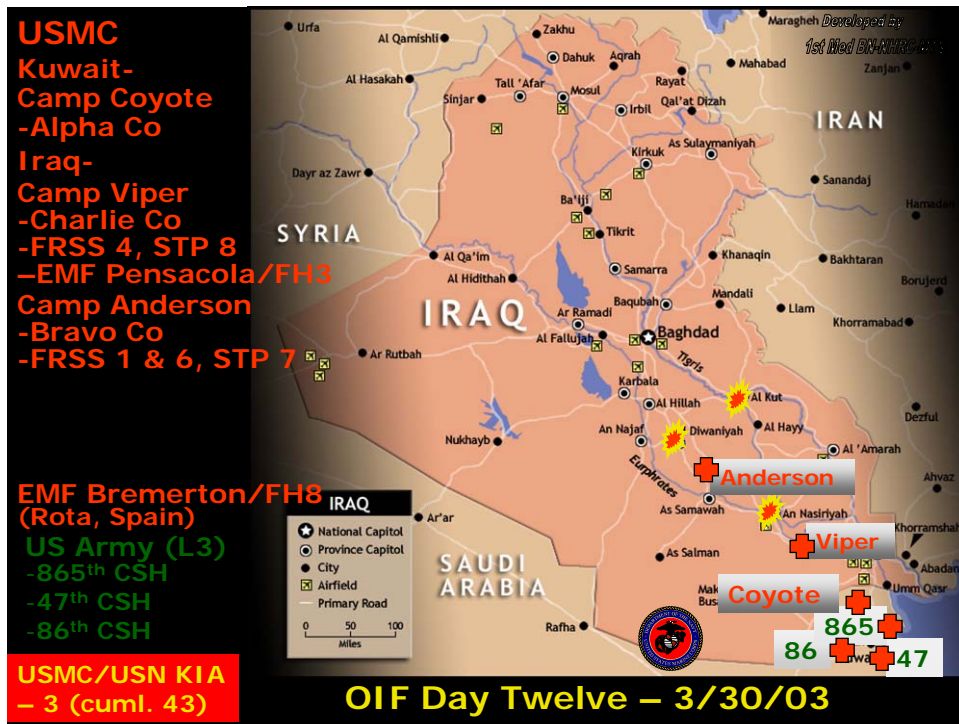


Figure 1. Theater laydown for Marine medical facilities in OIF-1 - March 30, 2003

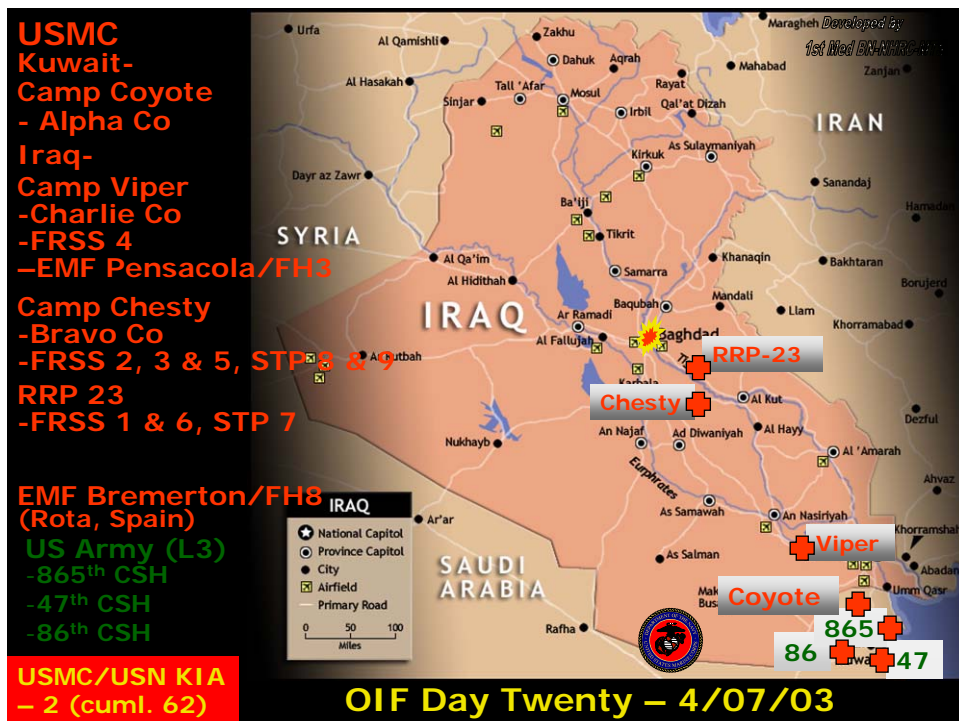


Figure 2. Theater laydown for Marine medical facilities in OIF-1 - April 7, 2003



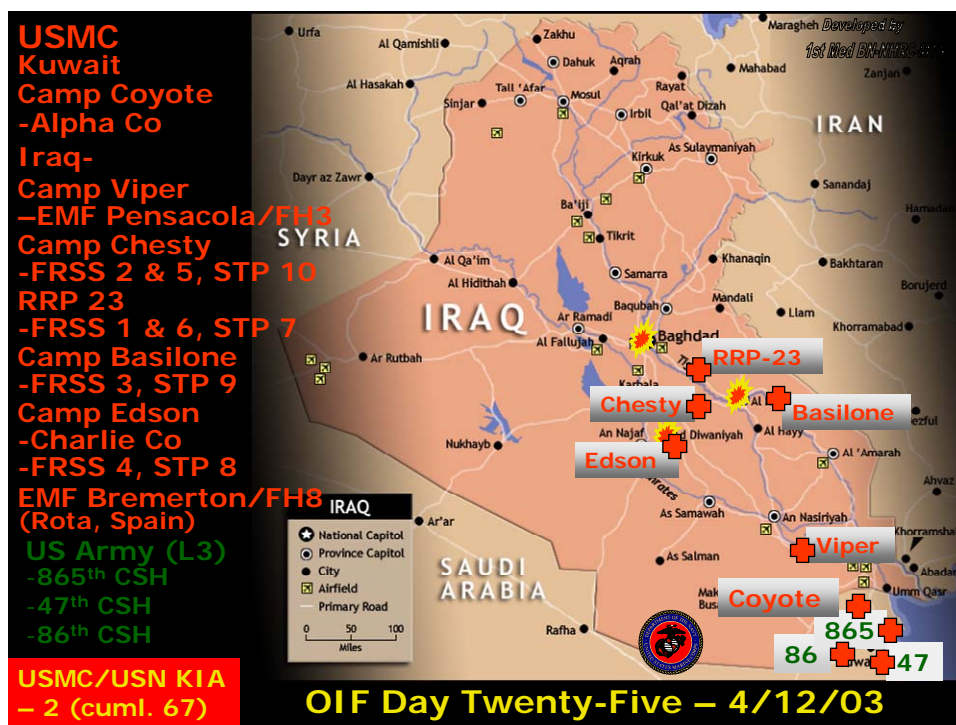


Figure 3. Theater laydown for Marine medical facilities in OIF-1 - April 12, 2003

## Alpha Surgical Company

The OIF-1 data from Alpha Company cover the period from March 21, 2003, to April 30, 2003. During this period, there were 644 presentations at Alpha representing 559 unique patients, with an average of 15.0 presentations a day for the 43 days covered by the data. Excluding those patients who were dead on arrival (DOA), 15.1% of these presentations were for wounded in action (WIA) injuries, 84.4% were for disease and non-battle injuries (DNBI), and for 0.5% the casualty type was not recorded.

Table 1 shows the branch of service for the 559 unique patients treated at Alpha Company. It can be seen from the table that US troops represented over 98% of the patient load at Alpha (551 of 559 patients). These 559 patients presented for care 644 times, indicating that a number of patients were treated for either follow-up care or subsequent diseases and injuries. It can be further seen that fewer than 1% of the patients were civilians or enemy prisoners of war (EPWs), and that the status of several patients was not recorded. As a Kuwaiti-based facility, Alpha Company saw very few patients who were not US military personnel.

Table 1. Alpha Company Patient Status for OIF-1				
	Patients	Percent	Presentations	Percent
USMC	299	53.5%	336	52.2%
USN	177	31.7%	221	34.3%
USA	75	13.4%	79	12.3%
Civilian	2	0.4%	2	0.3%
EPW	2	0.4%	2	0.3%
Not recorded	4	0.7%	4	0.6%
<b>Total</b>	<b>559</b>	<b>100.0%</b>	<b>644</b>	<b>100.0%</b>

Figure 4 shows that the WIA patient stream peaked early in the operation and then tapered off, with the last WIA patient seen at Alpha Company on April 1. This pattern reflects the decreasing combat support role played by Alpha Company, as high-tempo operations moved north of the Kuwaiti-based facility. As its combat support role diminished, Alpha's role in administering sick-call care increased, as evidenced by the greater number of DNBI cases seen near the conclusion of the major combat period.

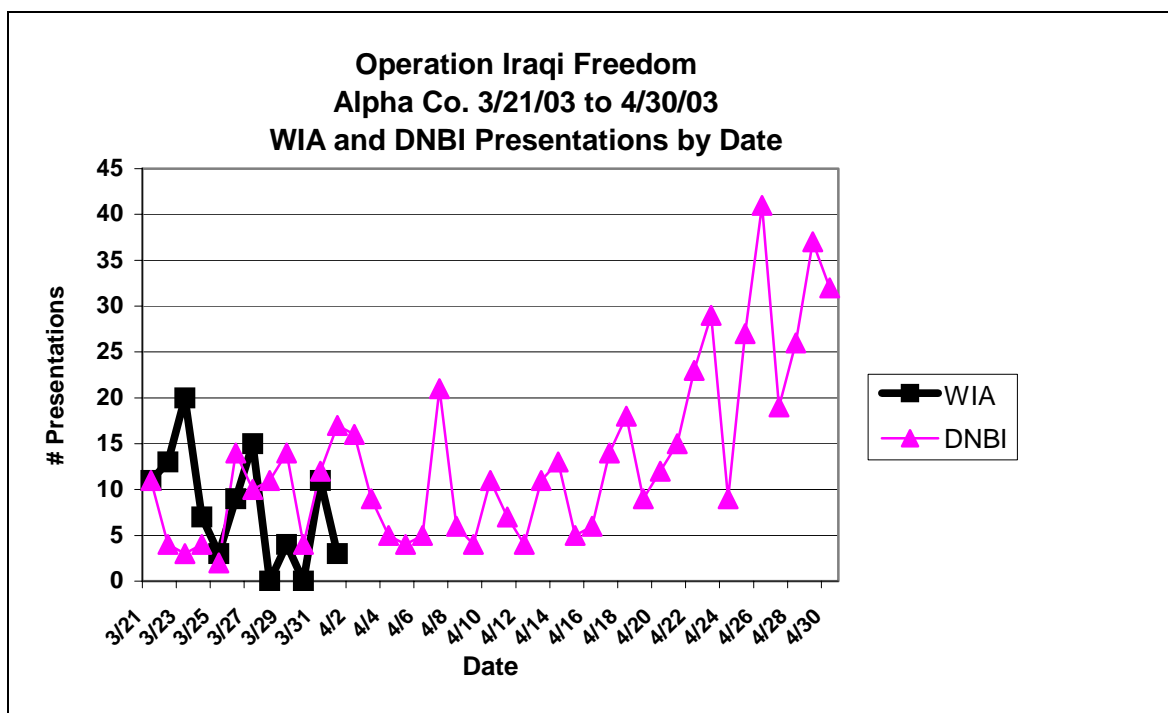


Figure 4. WIA and DNBI presentations at Alpha Company

<b>Table 2. Triage Category at Alpha Company</b>				
	<b>WIA</b>		<b>DNBI</b>	
	<b>Total</b>	<b>Percent</b>	<b>Total</b>	<b>Percent</b>
Dead on Arrival	3	3.1%	1	0.2%
Died of Wounds	1	1.0%	0	0.0%
Immediate/Urgent	34	35.1%	11	2.0%
Priority	18	18.6%	6	1.1%
Routine	17	17.5%	508	93.4%
Delayed	19	19.6%	11	2.0%
Minimal	5	5.2%	7	1.3%
<b>Total</b>	<b>97</b>	<b>100.0%</b>	<b>544</b>	<b>100.0%</b>

Table 2 shows the triage status for the WIA and DNBI presentations at Alpha Company. The majority of WIA presentations were at Priority classification or higher, including 35% Immediate. With regard to the DNBI presentations, more than 93% were routine, illustrating the large role sick call played in the patient mix at Alpha.

Table 3 shows the final disposition for the WIA presentations by their length of stay at the facility. As expected, most WIA patients (82%) were evacuated to a higher level of care.

<b>Table 3. Length of Stay by Final Disposition for WIA Patients at Alpha Company</b>						
<b>Length of Stay</b>	<b>RTD</b>	<b>Air Evac</b>	<b>Ground Evac</b>	<b>Not Rec*</b>	<b>Total</b>	<b>Percent</b>
~1 hour or less	2			2	4	4.1%
1 to 6 hours		26	2	2	30	30.9%
6 to 12 hours	1	22	3		26	26.8%
12 to 24 hours	4	6	6		16	16.5%
24 to 48 hours	1	12†	3†		16	16.5%
48 to 72 hours	3				3	3.1%
72 to 96 hours	1				1	1.0%
96 to 120 hours	1				1	1.0%
<b>Total</b>	<b>13</b>	<b>66</b>	<b>14</b>	<b>4</b>	<b>97</b>	<b>100.0%</b>
<b>Percentage</b>	<b>13.4%</b>	<b>68.0%</b>	<b>14.4%</b>	<b>4.1%</b>	<b>100.0%</b>	
*3 unrecorded were DOA.						
†Delay likely due to serious sandstorm.						

Table 3 also shows that most WIA presentations were evacuated within 24 hours, with those staying longer either delayed by weather or eventually returned to duty (RTD). At Alpha Company, 13.4% of those suffering combat wounds were RTD.

<b>Table 4. Length of Stay by Final Disposition for DNBI Patients at Alpha Company</b>						
<b>Length of Stay</b>	<b>RTD</b>	<b>Air Evac</b>	<b>Ground Evac</b>	<b>Not Rec</b>	<b>Total</b>	<b>Percent</b>
~1 hour or less	314	1	1	4	320	58.8%
1 to 6 hours	119	7	6	1	133	24.4%
6 to 12 hours	2	4	7		13	2.4%
12 to 24 hours	8	1	7		16	2.9%
24 to 48 hours	21		4		25	4.6%
48 to 72 hours	7	1			8	1.5%
72 to 96 hours	2	1			3	0.6%
Not rec./miscoded	10			16	26	4.8%
<b>Total</b>	<b>483</b>	<b>15</b>	<b>25</b>	<b>21</b>	<b>544</b>	<b>100.0%</b>
<b>Percentage</b>	<b>88.8%</b>	<b>2.8%</b>	<b>4.6%</b>	<b>3.9%</b>	<b>100.0%</b>	

The final disposition for the Alpha Company DNBI presentations by their length of stay at the facility is shown in Table 4. Overall, 7% were evacuated, 89% were RTD, while 4% were not recorded. The table highlights the role Alpha Company played in sick call. A total of 58% of the DNBI presentations (314 of 544) were RTD in less than 1 hour, with another 20% (119 of 544) RTD within 6 hours. There were also 30 presentations (5.5% of the total) who stayed at Alpha in excess of 24 hours, yet were still RTD, thereby reducing the need for medevac assets. Altogether, fewer than 8% of the DNBI presentations had to be evacuated.

Of the 544 DNBI presentations seen at Alpha Company, at least 35 were for psychological problems. However, at least 10 of these were follow-up visits. Table 5 lists the clinical conditions describing these presentations.

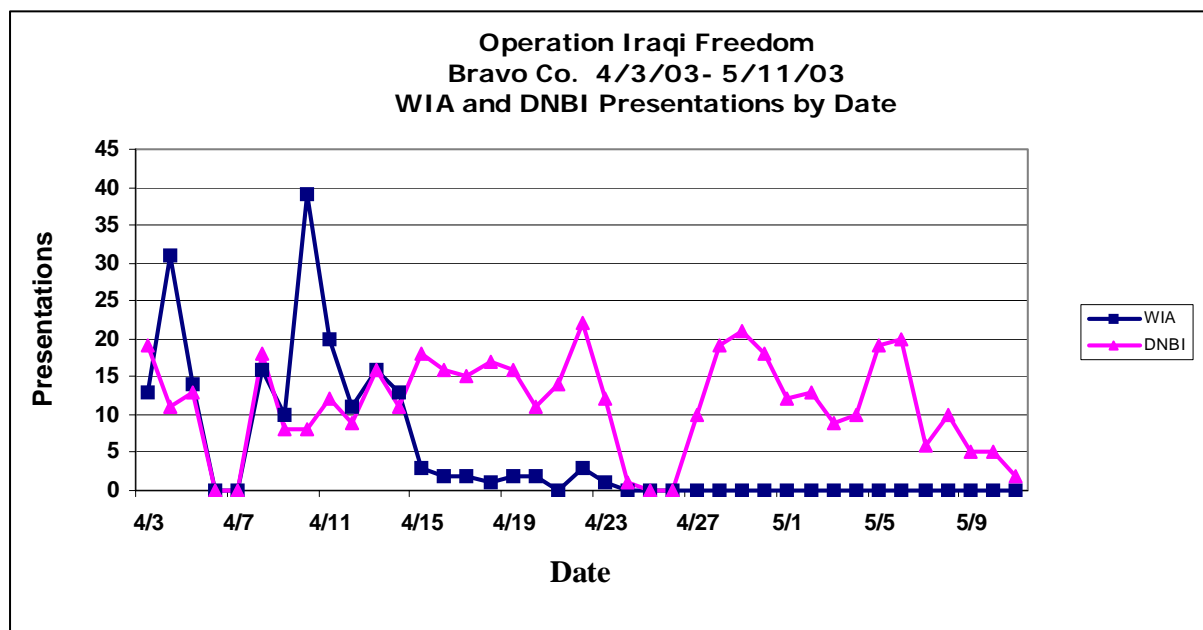
<b>Table 5. Psychology-Related Presentations at Alpha Company</b>		
	<b>Patients</b>	<b>Presentations</b>
Combat stress	13	20
Adjustment disorder	5	8
Borderline personality disorder	3	3
Major depressive disorder	3	3
Occupational problems	1	1
<b>Total</b>	<b>25</b>	<b>35</b>

## Bravo Surgical Company

The Bravo Surgical Company patient data reflect the period from April 3, 2003 to May 11, 2003. The company was first located in southern Iraq, then relocated to central Iraq, south of Baghdad. During this period, there were 667 presentations at Bravo, 31.6% of them WIA, 67.6% DNBI, and 0.7% unknown or not recorded. Determining the precise number of individual patients seen at Bravo was not possible because EPW and foreign national patients were not always identified by name, and although most were initial visits (as opposed to follow-ups), it could not be determined with certainty if this was always the case. If an assumption is made that no EPW or foreign national presentations are follow-ups, the distribution of patients seen at Bravo Company is shown in Table 6.

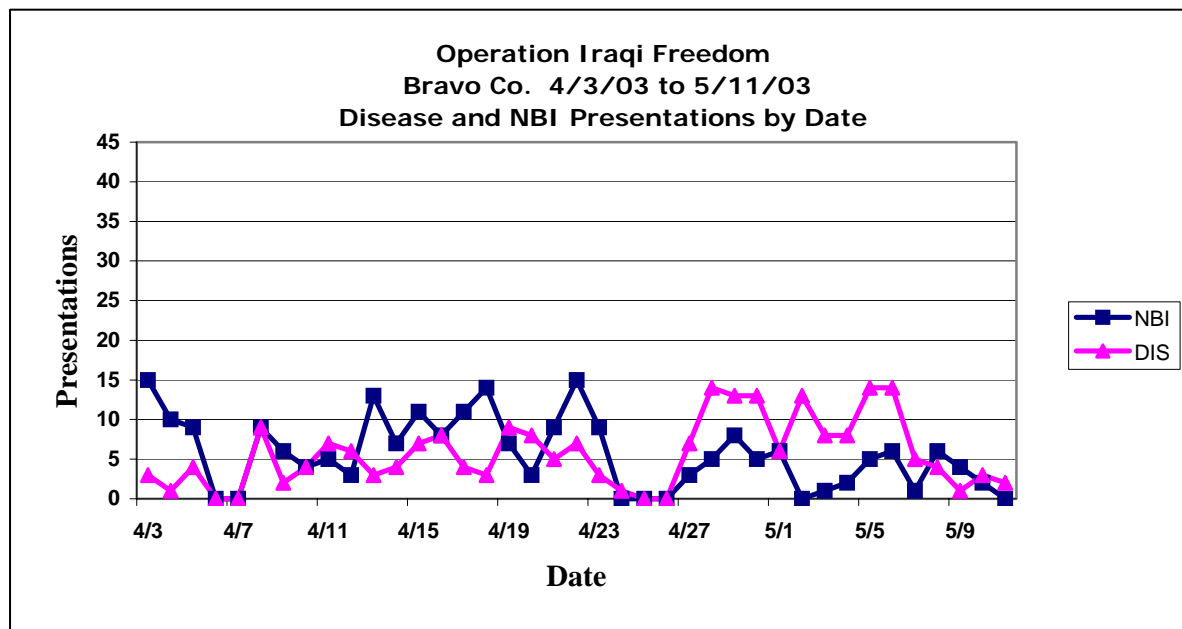
<b>Table 6. Bravo Company Patient Status for OIF-1</b>				
<b>Branch</b>	<b>Patients</b>	<b>Percent</b>	<b>Presentations</b>	<b>Percent</b>
USMC	370	56.9%	376	56.4%
USN	82	12.6%	88	13.2%
EPW	78	12.0%	78	11.7%
Foreign national	69	10.6%	69	10.3%
USA	45	6.9%	50	7.5%
Civilian	4	0.6%	4	0.6%
USAF	1	0.2%	1	0.1%
Not recorded	1	0.2%	1	0.1%
<b>Total</b>	<b>650</b>	<b>100.0%</b>	<b>667</b>	<b>100.0%</b>
Note: Table assumes that non-US troop patients did not have follow-up visits.				

The Bravo Company data set provided additional information such as a breakdown of DNBI into separate disease (DIS) and nonbattle injury (NBI) groups, and a list of the surgical procedures performed on OR patients. With 667 presentations over the 39 days covered by the data set, Bravo averaged 17.1 patients per day. Figure 5 shows the number of WIA presentations by date. Most of the WIA patients were seen by April 14; the last one was seen on April 23.



**Figure 5. Bravo Company OIF 1 WIA and DNBI Presentations by Date**

Figure 6 shows DNBI presentations by date, separated into NBI and DIS groups. While there were almost an even number of NBI and DIS patients (222 vs. 229), 76% of the NBI patients were seen before April 24, compared with only 43% of the DIS patients. As the operational tempo declined toward the conclusion of the official combat period, the frequency of NBIs diminished, while DIS presentations increased.



**Figure 6. Bravo Company OIF 1 DIS and NBI Presentations by Date**

Table 7 shows the breakdown by patient type for Bravo Company. Being in closer proximity to maneuver elements, Bravo Company had approximately double the percentage of WIA patients compared with Alpha Company. There was also a larger number of DOAs.

Table 7. Casualty Type for Presentations at Bravo Company		
	Total	Percent
Wounded in action	198	29.7%
Nonbattle injury	222	33.3%
Disease	229	34.3%
Injury (not specified)	1	0.1%
Dead on arrival	13	1.9%
Unknown	4	0.6%
<b>Total</b>	<b>667</b>	<b>100.0%</b>

Table 8 presents the status of Bravo Company patients according to triage category. It should be noted that at Bravo Company, the vast majority of patients (86%) had delayed triage, whereas at Alpha Company, the majority of patients were routine.

Table 8. Triage Category for Bravo Company						
	WIA		NBI		DIS	
	Total	Percent	Total	Percent	Total	Percent
Immediate/Urgent	38	19.2%	14	6.3%	9	3.9%
Priority	4	2.0%	0	0.0%	1	0.4%
Routine	9	4.5%	6	2.7%	2	0.9%
Delayed	140	70.7%	201	90.5%	217	94.8%
Not recorded	2	1.0%	1	0.5%	0	0.0%
Died of wounds	5	2.5%	0	0.0%	0	0.0%
<b>Total</b>	<b>198</b>	<b>100.0%</b>	<b>222</b>	<b>100.0%</b>	<b>229</b>	<b>100.0%</b>

Additionally, while Alpha Company patients were almost exclusively US troops, Bravo Company had a relatively high number of EPW patients (11.7% of all presentations) and foreign nationals (10.3%). Table 9 shows the breakdown by casualty type for US forces, EPWs, and foreign nationals.

Table 9. Casualty Type by Patient Status for Bravo Company Presentations										
	US Forces		EPW		Foreign Nationals		Civilian/ Other		Total	
	#	%	#	%	#	%	#	%	#	%
WIA	90	17%	59	76%	44	64%	0	0%	193	29%
NBI	190	37%	11	14%	19	28%	2	40%	222	33%
DIS	221	43%	1	1%	5	7%	2	40%	229	34%
INJ	1	0%	0	0%	0	0%	0	0%	1	0%
DOA	11	2%	1	1%	0	0%	1	20%	13	2%
DOW	1	0%	4	5%	0	0%	0	0%	5	1%
UNK	1	0%	2	3%	1	1%	0	0%	4	1%
<b>Total</b>	<b>515</b>	<b>100%</b>	<b>78</b>	<b>100%</b>	<b>69</b>	<b>100%</b>	<b>5</b>	<b>100%</b>	<b>667</b>	<b>100%</b>

The majority of the WIA patients treated at Bravo were EPWs or foreign nationals (103 of 193). In contrast, the US forces seen at Bravo Company were largely treated for DIS and NBIs.

Table 10 shows the final disposition of WIA patients according to their length of stay at Bravo Surgical Company. The length of stay breakdowns at Bravo and Alpha Companies are very similar if a delay at Alpha Company due to a sandstorm is taken into account. However, 13.4% of the WIA patients at Alpha Company were RTD, compared with only 4.0% at Bravo Company.

Table 10. Length of Stay by Final Disposition for WIA Patients at Bravo Company						
Length of Stay	RTD	Air Evac	Ground Evac	Morgue*	Total	Percent



~1 hour or less	1	6		0	7	3.5%
1 to 6 hours	2	59	4	2	67	33.8%
6 to 12 hours		40		1	41	20.7%
12 to 24 hours	3	68		1	72	36.4%
24 to 48 hours		8		1	9	4.5%
Not rec./miscoded	2				2	1.0%
<b>Total</b>	<b>8</b>	<b>181</b>	<b>4</b>	<b>5</b>	<b>198</b>	<b>100.0%</b>
<b>Percent</b>	<b>4.0%</b>	<b>91.4%</b>	<b>2.0%</b>	<b>2.5%</b>	<b>100.0%</b>	

\*DOW patients.

Tables 11 and 12 show the disposition of NBI and DIS patients at Bravo according to their length of stay. Although the duration of their stays were similar for both types of patients, almost twice as many DIS cases were RTD compared with those with NBIs. Because Bravo was farther away from Combat Support Hospitals (CSHs) and other upper echelon facilities, a smaller percentage of casualties used ground evacuation compared to those at Alpha Company.

<b>Table 11. Length of Stay by Final Disposition for NBI Patients at Bravo Company</b>					
<b>Length of Stay</b>	<b>RTD</b>	<b>Air Evac</b>	<b>Ground Evac</b>	<b>Total</b>	<b>Percent</b>
~1 hour or less	34	6	5	45	20.3%
1 to 6 hours	35	34	1	70	31.5%
6 to 12 hours		35		35	15.8%
12 to 24 hours	4	43		47	21.2%
24 to 48 hours	5	14		19	8.6%
48 to 72 hours	1	1		2	0.9%
72 to 96 hours	2			2	0.9%
Not rec./miscoded	2			2	0.9%
<b>Total</b>	<b>83</b>	<b>133</b>	<b>6</b>	<b>222</b>	<b>100.0%</b>
<b>Percent</b>	<b>37.4%</b>	<b>59.9%</b>	<b>2.7%</b>	<b>100.0%</b>	

<b>Table 12. Length of Stay by Final Disposition for DIS Patients at Bravo Company</b>					
<b>Length of Stay</b>	<b>RTD</b>	<b>Air Evac</b>	<b>Ground Evac</b>	<b>Total</b>	<b>Percent</b>
~1 hour or less	53	2		55	24.0%
1 to 6 hours	62	16	1	79	34.5%
6 to 12 hours	5	12		17	7.4%
12 to 24 hours	25	26		51	22.3%
24 to 48 hours	13	8		21	9.2%

48 to 72 hours	2	2		4	1.7%
72 to 96 hours	1			1	0.4%
Not rec./miscoded	1			1	0.4%
<b>Total</b>	162	66	1	229	100.0%
<b>Percent</b>	70.7%	28.8%	0.4%	100.0%	

## Bravo Surgical Company – Surgical Procedures

An examination of the Bravo Company surgical cases shows that 107 surgical procedures were performed on 64 patients during the major combat period. Of the 64 patients, 33 were US forces (31 Marines, 2 Army), 24 were EPWs, and 7 foreign nationals. Table 13 shows the mechanism of injury for these three groups of surgical patients.

<b>Table 13. Mechanism of Injury by Patient Status for Bravo Company Surgeries</b>					
	<b>US Forces</b>	<b>EPW</b>	<b>Foreign Nationals</b>	<b>Total</b>	<b>Percent</b>
Gunshot wound	9	16	3	28	43.8%
Shrapnel	6	1	1	8	12.5%
Disease	4			4	6.3%
Motor vehicle	3			3	4.7%
Blast	1			1	1.6%
RPG	1			1	1.6%
Not App./Not Rec.	9	7	3	19	29.7%
<b>Total</b>	33	24	7	64	100.0%

For the EPW and foreign national surgery patients, the vast majority (28 of 31) were WIA, and when the mechanism of injury was known, most had gunshot wounds. The 33 surgery patients among the US forces included 12 NBIs and 4 cases classified as DIS (appendectomies). Three were injured in motor vehicle accidents.

Table 14 lists the surgical procedures performed on US troops, EPWs, and foreign nationals at Bravo Company, of which irrigation and debridement and fasciotomy were the two most common.

<b>Table 14. Procedures Performed by Patient Status for Bravo Company Surgery Patients</b>				
<b>Procedures</b>	<b>US Forces</b>	<b>EPW</b>	<b>Foreign Nationals</b>	<b>Total</b>

Irrigation & debridement	12	12	4	28
Fasciotomy	14	3	3	20
Exploratory laparotomy	2	8		10
Other orthopedic	3	3	1	7
Tissue exploration	4	2	1	7
Amputation	3	3		6
External fixation	1	4	1	6
Appendectomy	4			4
Colostomy	1	3		4
Fx reduction	4			4
Tissue resection	2		1	3
Vascular shunt		2		2
Chest tube placement		1		1
Cholecystectomy	1			1
Cystostomy		1		1
Decompression craniotomy	1			1
Mandibular wire	1			1
Thoracotomy		1		1
<b>Total procedures</b>	53	43	11	107
<b>Total patients</b>	33	24	7	64

A greater number of exploratory laparotomies were performed on EPWs than on the other two groups, suggesting the benefit provided to US forces by the use of body armor. An average of 1.67 surgical procedures were done per patient, and that average did not significantly vary among the three groups.

## Charlie Surgical Company Details

The Charlie Company data set was less robust than either Alpha or Bravo Companies, with a limited number of variables recorded for 101 patients. Due to the limitations of this data set, the complete count of Charlie Company patients is unknown. For the 101 known patients, 86 were US Marines and 3 US Navy; 12 did not record their service branch. Table 15 shows the casualty types for those 101 patients.

<b>Table 15. Charlie Company Casualty Types</b>		
	<b>Total</b>	<b>Percent</b>
Wounded in action	33	32.7%
Injury (not specified)	41	40.6%
Disease	16	15.8%
Psych	2	2.0%
Dead on arrival	2	2.0%
Not rec./Unknown	7	6.9%
<b>Total</b>	101	100.0%

It should be noted that the WIA figure represents those identified as having a battle wound. The 40.6% in the “Injury (not specified)” category include both battle and nonbattle injuries. The percentage of DIS patients (15.8%) was lower than for Bravo Company, where DIS presentations were 42% of the total for US troops.

Table 16 shows the triage categories for the WIA, Unspecified Injury, and DIS groups:

<b>Table 16. Triage Category for Charlie Company</b>						
	<b>WIA</b>		<b>Unspecified Injury</b>		<b>DIS</b>	
	<b>Total</b>	<b>Percent</b>	<b>Total</b>	<b>Percent</b>	<b>Total</b>	<b>Percent</b>
Immediate	4	12.1%	6	14.6%	1	6.3%
Urgent	4	12.1%	2	4.9%	0	0.0%
Priority	3	9.1%	2	4.9%	0	0.0%
Routine	1	3.0%	3	7.3%	3	18.8%
Delayed	19	57.6%	18	43.9%	6	37.5%
Not recorded	2	6.1%	10	24.4%	6	37.5%
<b>Total</b>	33	100.0%	41	100.0%	16	100.00%

This table is not directly comparable to the Bravo Company data in Table 8, since it could not be determined for many of the injuries whether they were WIA or NBI. But for those who had their triage category recorded, 46 of 77 (57%) were considered delayed.

## Summary

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Both Alpha and Bravo Cos. saw an average of 15 to 17 patients a day, with most of the WIA patients seen in the first 2 weeks. However, there were distinct differences in the type of patients seen at the two facilities. Bravo Company had a much higher percentage of EPWs and foreign nationals, and a higher percentage of patients who were evacuated rather than RTD. The majority of EPWs and foreign nationals seen at the facilities were treated for battle injuries, while the majority of US troops seen were DNBI patients. At both facilities, about 15% to 17% of the US patients were WIA. In contrast, approximately 76% of the EPW patients and about 65% of the foreign nationals were WIA.

Only 11% of Alpha Company patients were evacuated to other facilities within the first 24 hours of arrival compared with 54% of Bravo Company patients. Fewer than 20% were held over for more than 24 hours at either facility. Information on surgeries was only available for Bravo Company, where almost half of its surgery patients (48%) were EPWs or foreign nationals. Irrigation and debridement, fasciotomies, and exploratory laparotomies were the most common surgical procedures performed, together constituting over half of the total.

In addition to comparing results over the same level of care, data sets received by the CTR also present the opportunity to merge information across several levels of care for individual patients, so that a more complete picture of treatment, care, and rehabilitation of individual patients can be ascertained. For example, Naval Health Research Center personnel have obtained the hospitalization records of over 100 patients received at the Landstuhl Regional Medical Center in Germany who were previously treated at the surgical companies during OIF-1. A sample case study developed by clinical staff using information from both the Bravo Surgical Company and the Landstuhl hospitalization record is presented below:

Case Study — 23 year old USMC CPL injured on 03 April 2003 at 0950 during a firefight. Struck by a high velocity gunshot wound to the left knee resulting in a comminuted left distal femur fracture. After being shot, the patient fell into a contaminated canal. On the day of injury, the patient underwent irrigation and debridement of a left lateral thigh exit wound, left knee arthrotomy and placement of an external fixator device at the 47th CSH. On 07 April, he was taken back to surgery at the 47th CSH for a washout of his wounds. On 08 April, the patient was medevaced from Kuwait City to Fleet Hospital 3 in Rota, Spain. On 11 April, the patient was medevaced from Rota, Spain to Ramstein, Germany, arriving at Landstuhl Regional Medical Center on 12 April where he was taken to the operating room for irrigation and debridement of his wounds and an open reduction internal fixation of his fracture. On 16 April, the patient developed purulent drainage of his wound and went back to the operating room for another irrigation and debridement and placement of antibiotic beads. On 22 April, he had further drainage of his wound and was again

*taken to the operating room for another irrigation and debridement. Wound cultures came back positive for Enterobacter. On 28 April, the patient was transferred to Bethesda Naval Medical Center via the Air Evacuation System.*

With a structured process like the CTR facilitated throughout the operational period, a more comprehensive view of the events occurring to casualties as they move through the medical chain of evacuation can be assembled. It is the expectation that this will provide new insights into combat injury patterns and casualty management and care.

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<b>14. ABSTRACT (maximum 200 words)</b>  The Navy-Marine Corps Combat Trauma Registry (CTR) is a data repository and warehouse summarizing information from data sets describing events that occurred and treatments administered to casualties from the point of injury to rehabilitation. Among the medical facilities contributing data to the CTR during Operation Iraqi Freedom (OIF) were the Marine Corps forward surgical companies. Surgical companies offer resuscitative surgery, medical treatment and temporary holding facilities, in addition to preparing patients for evacuation. This paper reviews the types of patients admitted to and treatments received at the surgical companies during the major combat period of OIF. The surgical companies saw an average of 15 to 17 patients a day during this period. Fewer than 20% of the U.S. casualties were wounded in action. In contrast, over 75% of the enemy prisoner of war presentations were for battle injuries. Fewer than 15% of the patients were held at the facilities for more than 24 hours.					
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